DEPARTMENT OF HEALTH

Environmental Health Tracking and Biomonitoring

REPORT TO THE LEGISLATURE

JUNE 2019

Environmental Health Tracking and Biomonitoring

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DEPARTMENT OF HEALTH

Protecting, Maintaining and Improving the Health of All Minnesotans

June 24, 2019
Chairs and Ranking Members
Health and Environment Committees
Minnesota State Legislature

Dear Legislators:

The Minnesota Department of Health (MDH) is pleased to share this Legislative Report on the progress of our Environmental Health Tracking and Biomonitoring Program, in accordance with Minnesota Statute 144.996, Subdivision 1.2.

Created in 2007 by the Minnesota Legislature, the Environmental Health Tracking and Biomonitoring Program was directed to gather and share with the public data on environmental hazards, chemicals in people (biomonitoring) and chronic diseases in Minnesota. This report highlights achievements and innovations since our last report in 2017, as we continue to build our state's capacity for monitoring current trends, disparities, and geographic patterns of environmental hazards, exposure and public health in communities, guided by the Environmental Health Tracking and Biomonitoring Scientific Advisory Panel.

Continuing investment in this program will enable MDH to track and share its progress in addressing environmental public health issues in Minnesota, such as mercury exposure in pregnant women and newborns, air quality impacts on health, contaminants in drinking water, chronic diseases and health equity across diverse communities. Improving public access to current, accurate information helps citizens, communities and health officials make better decisions and policy to protect and improve the health of Minnesotans and future generations.

Sincerely,

Jan K. Malcolm
Commissioner
P.O. Box 64975
St. Paul, MN 55164-0975

Enclosure: 2019 Report to the Legislature

Contents

Program overview

First established by the Minnesota Legislature in 2007, Minnesota's **Environmental Health Tracking and Biomonitoring** program connects the dots between environment, exposures, health and social conditions. These are all important in understanding how best to protect the health of Minnesotans.

Today, the program brings together community studies of population exposures to environmental chemicals and statewide monitoring of environmental hazards, human exposure and population health.

Data and information gained from this work:

- Inform program and policy decisions.
- Support new funding for local public health actions.
- Track the impacts of community and state programs working to improve public health.

Environmental Public Health Tracking

The Environmental Public Health Tracking Program (**MN Tracking**) supports data-driven approaches for environmental health action to prevent harmful exposures. Our epidemiologists analyze and integrate existing data gathered by disease surveillance, population surveys and environmental monitoring programs to understand connections between community health and physical, chemical and social environments. This work helps track trends and disparities and bridges data gaps for public health programs, including those whose main focus is enforcement or direct service delivery.

What we do:

- Manage the **MN Public Health Data Access Portal** to provide user-friendly, transparent, and innovative public access to data and tools for over 20 public health topics.

  Explore the portal (health.mn.gov/mndata)

- Conduct ongoing surveillance and targeted investigations to identify vulnerable populations and areas, respond to emerging environmental health concerns, and provide evidence for public health decision-making, evaluation and planning.

- Work with partners across MDH and other state agencies; local public health departments; policymakers; healthcare systems and providers; and education, non-governmental and community stakeholders on data-driven health promotion strategies.

MN Tracking is supported by a federal cooperative agreement with the U.S. Centers for Disease Control and Prevention's National Environmental Public Health Tracking Network (ephtracking.cdc.gov/showHome) and the Air and Health Joint Initiative with the Minnesota Pollution Control Agency (MPCA).

Biomonitoring

We are all exposed to chemicals in our air, water, food and consumer products. Some can be harmful to our health. The **MN Biomonitoring: Chemicals in People** program measures levels of chemicals in people from different communities in the state. We check whether levels differ between groups or over time. Our information is used to promote public health actions that reduce chemical exposures and address health disparities.

What we do:

- Conduct community studies across the state by testing for chemicals in blood or urine. We focus on chemicals of concern like metals and per- and polyfluoroalkyl substances (PFAS, formerly known as PFCs) that are the subject of public health action to reduce exposures. These studies, done in collaboration with communities and other partners:
  - Evaluate public health actions to reduce exposures by measuring changes over time.
  - Identify communities that are highly exposed to chemicals.
  - Measure exposures in vulnerable Minnesotans, including pregnant women and children.
- Increase our state Public Health Laboratory's ability to monitor population chemical exposures. The expanded scope of available testing makes Minnesota uniquely prepared to address exposure concerns and respond to emergencies.

The MN Biomonitoring program is funded by the state under the joint Minnesota Pollution Control Agency-MDH Environmental Risks Initiative.

In this report, we highlight two current biomonitoring studies:

- MN Family Environmental Exposure Tracking (**MN FEET**)
- **Healthy Rural and Urban Kids**

Scientific Advisory Panel

The **Environmental Health Tracking and Biomonitoring Advisory Panel** was established by law in 2007. Appointed members represent key stakeholder groups with a background in public health or related sciences and provide important guidance to the Commissioner of Health. They advise on program decisions, including selection of chemicals and communities for MN Biomonitoring, as well as data and analyses for MN Tracking.

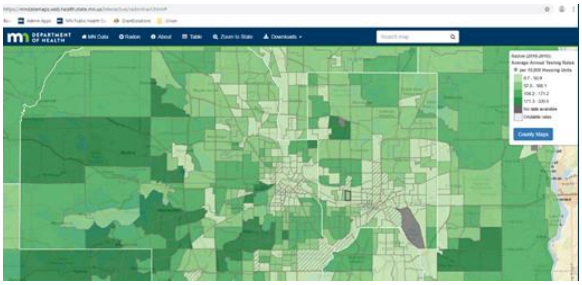
The Advisory Panel meetings occur three times per year and are open to the public. Member roster, meeting notes and the complete statute are available on the Advisory Panel website (https://www.health.state.mn.us/communities/environment/biomonitoring/advisorypanel/index.html).

Environmental Public Health Tracking

FROM DATA TO ACTION: HIGHLIGHTS FROM 2018 COLLABORATIONS

Local data reveal health inequities

Fine-scale geographic data is important for understanding spatial patterns and disparities in environmental hazards, exposures and health outcomes. We developed new sub-county data with MDH's Indoor Air Unit to enable stakeholders to more effectively allocate public health resources and address inequities. We found that radon testing rates are generally lowest in areas with more households living in poverty. Our new map helps partners improve targeted radon education to increase testing and mitigation efforts – including in low-income neighborhoods.



Health in all policies

MN Tracking works with MPCA to reduce health impacts of air pollution. As part of the Volkswagen Settlement, MN Tracking created a novel measure – a *health vulnerability score* – to identify areas with high rates of health conditions that can make individuals more vulnerable to air pollution exposure. Our health vulnerability score contributed to MPCA's review of diesel pollution reduction grants and meaningfully expanded efforts to advance health equity and environmental justice.

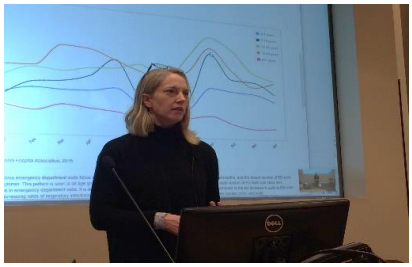
Tracking health in Greater MN cities

Over the past year, we worked with three local public health departments to identify zip codes that comprise the urban areas of Rochester, St. Cloud and Duluth, toward better describing how health profiles vary within Greater MN counties. We started by looking at rates of hospital visits for asthma and chronic obstructive pulmonary disorder (COPD), and found that asthma hospital visit rates were higher in urban areas, compared to surrounding counties.

Explore our City Data Pilot (data.web.health.state.mn.us/web/mndata/city-data) on the MN Public Health Data Access portal.

Building environmental health surveillance capacity

MN Tracking ensures that Minnesota's public health work force has the data and tools to address critical environmental public health questions. We provide training to local public health agencies, students, legislators, the media and others. Together, we build capacity for using data to inform actions that improve public health. Read more on the MN Tracking website (health.mn.gov/tracking).



Environmental Public Health Tracking

MN PUBLIC HEALTH DATA ACCESS PORTAL

Public access to environmental hazard, exposure & health data

The MN Public Health Data Access portal (health.mn.gov/mndata) tracks data on more than 20 environment and health topics. The portal provides an efficient system for sharing data all in one place, avoiding costs of creating and maintaining multiple data access systems and reducing staff time responding to data requests.

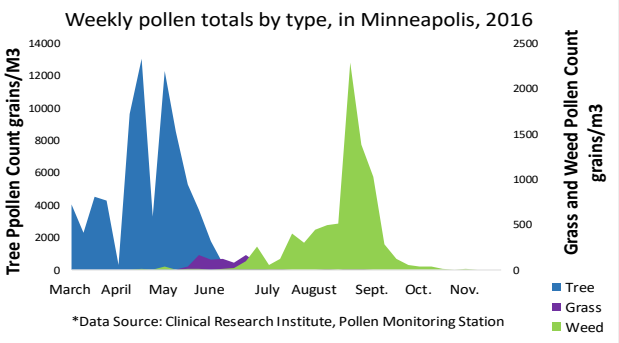
Public access to environmental health data is critical to improve the health of all Minnesotans. Portal data are used to:

- Compare environmental health trends over time and across communities.
- Track and evaluate the effectiveness of public health programs and policies.
- Help communities take action to reduce exposures and improve health.

New tools and analyses

Mapping childhood lead exposure for every MN census tract identified high-risk areas for targeted prevention work.

New pollen data showed how high-pollen seasons are changing over time and provided resources for tracking different pollen types to improve respiratory health.



Portal tools and topics

Integrating environmental health topics, data tools and public health promotion information helps bring data to action.

- Interactive data queries and maps
- County profiles and sub-county data
- Charts showing trends and disparities
- Downloadable data
- Risk and exposure prevention messages

Topic	CHARTS	MAPS	QUERY	COUNTY	SUB COUNTY
Air quality	●		●	●	
Asthma	●	●	●	●	●
Birth defects	●				
Birth outcomes	●	●	●	●	
Cancer	●	●	●	●	
Carbon monoxide poisoning	●		●	●	
Chemicals in people: biomonitoring	●				
Childhood lead exposure	●	●	●	●	●
COPD	●	●	●	●	●
Developmental disabilities	●				
Diabetes	●				
Drinking water quality	●	●	●	●	●
Environmental tobacco smoke	●				
Health insurance	●	●	●	●	
Heart attacks	●		●	●	
Heat-related illness	●	●		●	
Immunizations	●	●		●	●
Lyme disease	●	●			
Obesity	●	●		●	●
Oral health	●	●	●	●	
Pesticide poisoning	●				
Pollen	●				
Poverty & income	●	●	●	●	
Radon	●	●		●	
Smoking	●				
Traffic	●	●	●	●	
West Nile	●				●

MN Biomonitoring

MINNESOTA FAMILY ENVIRONMENTAL EXPOSURE TRACKING (MN FEET)

Measuring metals in women and babies

Mercury, lead and cadmium are chemicals in our environment that can harm health. They may affect brain development.

MN FEET is a study with MDH, HealthPartners Institute and Minnesota Community Care. We measured these chemicals in women and their newborn babies to learn more about how to protect families from these chemicals.

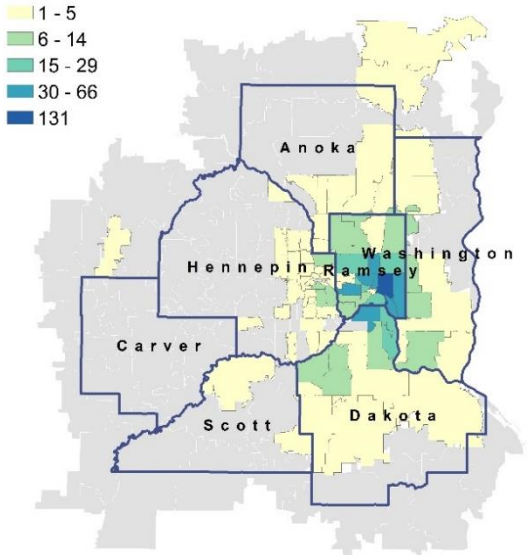
MN FEET was developed with guidance from the Environmental Health Tracking and Biomonitoring Advisory Panel.

Women in MN FEET

Participants were Asian, East African, Latina and White women who went to certain Twin Cities prenatal clinics and planned to give birth at affiliated hospitals (Regions or Abbott Northwestern Hospitals). Women gave informed consent to be included. Seventy percent of the women we asked agreed to join the study.

- 779 women answered survey questions.
- 408 women gave cord blood and/or urine samples: 156 Latina women, 141 White women, 83 Asian women, 28 East African women.
- 98% of Latina women, 36% of East African women and 20% of Asian women answered survey questions in a language other than English.
- Over half (63%) lived in Ramsey County; women were from 11 different Minnesota counties (Figure 1).

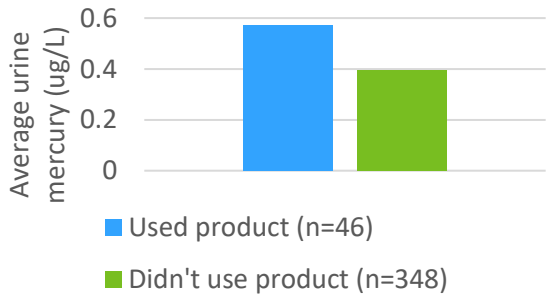
Figure 1. Number of women enrolled, by zip code



Mercury from using skin lightening products

MN FEET found that women in the study who used skin lightening creams in the past had more mercury in their urine (Figure 2).

Figure 2. Urine mercury and using a skin lightening product



Follow-up with women with high urine mercury found that skin lightening products were the main reason their urine was high. Home visits found that these products were putting mercury into the air the whole family was breathing.

Mercury from eating certain fish

Women in the study who ate more fish higher in mercury – Walleye, Northern Pike, Bass, White Bass or King Fish – had more mercury in their babies' cord blood.

Follow-up with women with high cord blood mercury found that most of them ate these fish more than once per month. MDH fish consumption guidelines advise pregnant women and children to eat these fish once a month or less.

Some groups at risk for high mercury

Asian women in the study, especially Hmong women, had the highest levels of mercury. Results show some Hmong women in Minnesota may have high mercury exposures from using skin lightening products *and* eating more fish higher in mercury.

Using skin lightening products may also be putting Latina and East African women in danger of high mercury levels. While the small number of East African women in the study limited what we learned about exposures in this community, they had the second highest mercury in their urine after Hmong women.

Lead and cadmium levels low

Fortunately, MN FEET found very low levels of both lead and cadmium in cord blood.

Using results and next steps

MDH and its partners are using the results to take action and shape programs to help women have less contact with mercury.

- Existing MDH programs give advice about eating fish low in mercury. The results can help target future efforts.
- MDH provides information to the public and health care providers about the dangers of skin lightening products. MN FEET showed that more work is needed to reach women from certain communities.
- Families, communities, providers and policymakers can use the results to protect women and children.

We are planning follow-up work to better involve East African women and determine whether clinic-based screenings are effective in reducing exposures.

The MN FEET Community Report (health.mn.gov/MNFEET) is available in English, Hmong, Somali and Spanish.

MN Biomonitoring

HEALTHY RURAL AND URBAN KIDS PROJECT

Measuring chemicals in Minnesota kids

The Healthy Rural and Urban Kids project (health.mn.gov/HealthyKids) measures certain chemicals in Minnesota children that may harm development. These chemicals show exposure to metals, air pollution, and different pesticides used in agriculture and around the home.

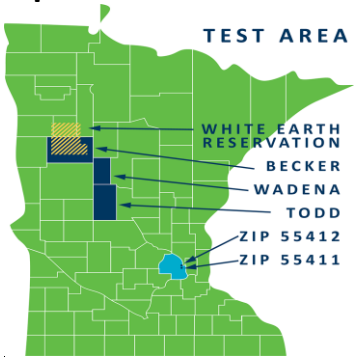
By testing kids from specific areas, we will learn if we need to take more steps to protect these kids from exposure so they are ready to learn and do well in school.

Healthy Kids is conducted with guidance from the MDH Environmental Health Tracking and Biomonitoring Advisory Panel.

Two communities included

In response to community concerns and information from other studies, we chose to recruit families from Minneapolis zip codes 55411 and 55412, and Becker, Todd and Wadena counties in the "Central Sands" region of north-central Minnesota.

Map of Recruitment Area



Families with preschool-age kids recruited

With the assistance of Early Childhood Screening Staff, families of children age 3-6 were recruited in summer 2018 to participate in Healthy Kids . Early childhood screening is required for all Minnesota children before kindergarten.

Parents who chose to join the study completed a survey and provided urine samples from their children.

Participation exceeded goals

Two hundred thirty-two children gave urine samples, exceeding our goal of 200. Participation rates were high in both rural and urban communities.

Participation by location and gender

Location	Female	Male	Total
Rural	60	68	**128**
Urban	54	50	**104**
Total	114	118	**232**

This successful recruitment was due to the hard work and community connections of staff from Minneapolis Public Schools, Becker County Public Health, Todd County Health and Human Services, and Wadena County Public Health.

Chemicals measured show different exposures

Healthy Kids is measuring exposure to over 20 different chemicals that can harm child development. These chemicals can be found in some sources of drinking water, in the air, and in products used in and around the home. Levels of exposure are determined by testing children's urine.

Healthy Kids is testing for these chemicals:

- **METALS**: Arsenic, Chromium, Cobalt, Manganese, Nickel
- **AIR POLLUTION CHEMICALS**: Polycylic aromatic hydrocarbons (PAHs), 1-Nitropyrene
- **PESTICIDES**: Organophosphate pesticides including chlorpyrifos; 2,4-D; pyrethroids including permethrin; macozeb; carbaryl

Growing state's ability to test for chemicals

The MDH Public Health Lab (PHL) analyzes the urine samples. Through Healthy Kids, the PHL has developed the ability to analyze 15 new chemicals in people's bodies. This scope of available testing is not found in most other states, making Minnesota uniquely prepared to monitor population chemical exposures and respond to community concerns and exposure-related emergencies.

Next steps

SUMMER 2019: Families receive their child's results and information on ways to reduce exposure.

FALL 2019: Communities receive a summary of deidentified study results. Results will also be shared with local public health, other agencies and policymakers.

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